

Abstract Submitted
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Electron Impact Ionization of Silicontetrachloride (SiCl_4)¹ RALF BASNER, INP Greifswald, MICHAEL GUTKIN, JENNY MAHONEY, VLADIMIR TARNOVSKY, Stevens Institute of Technology, HANS DEUTSCH, Institut für Physik, Greifswald, KURT BECKER, Stevens Institute of Technology — We measured absolute partial cross sections for the formation of various singly charged and doubly charged positive ions produced by electron impact on silicon tetrachloride (SiCl_4) using two different experimental techniques, a time-of-flight mass spectrometer (TOF-MS) and a fast-neutral-beam apparatus. The energy range covered was from the threshold to 900 eV in the TOF-MS and to 200 eV in the neutral beam apparatus. The results obtained by the two different experimental techniques were found to agree very well (better than their combined margin of error). The SiCl_3^+ fragment ion has the largest partial ionization cross section with a maximum value of slightly above $6 \times 10^{-20} \text{ m}^2$ at about 100 eV. The cross sections for the formation of SiCl_4^+ , SiCl^+ , and Cl^+ have maximum values around $4 \times 10^{-20} \text{ m}^2$. Some of the cross section curves exhibit an unusual energy dependence with a pronounced low-energy maximum at an energy around 30 eV followed by a broad second maximum at around 100 eV. The maximum cross section values for the formation of the doubly charged ions, with the exception of SiCl_3^{++} , are $0.05 \times 10^{-20} \text{ m}^2$ or less.

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